FIG. 1

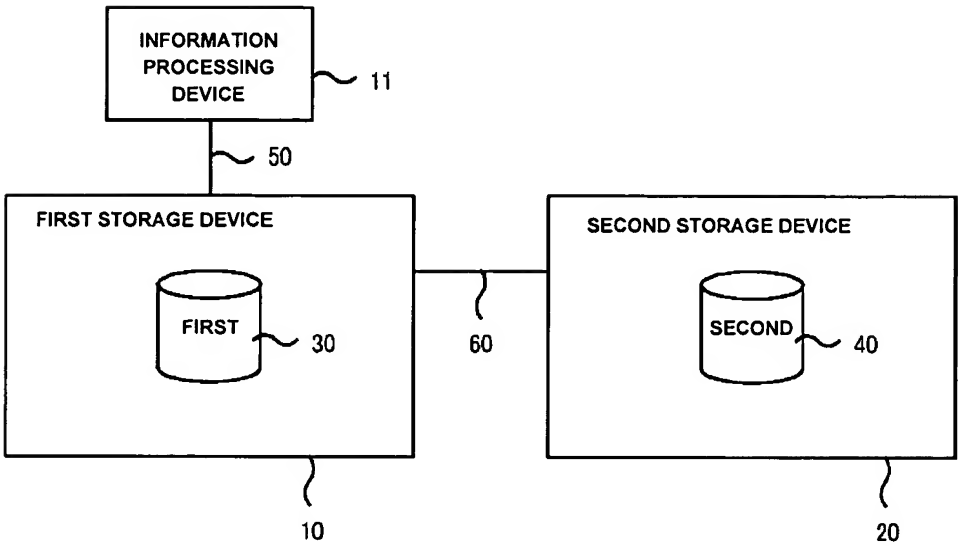

INFORMATION PROCESSING DEVICE
11
50
FIRST STORAGE DEVICE
FIRST
30
60
SECOND STORAGE DEVICE
SECOND
40
10
20

FIG. 2

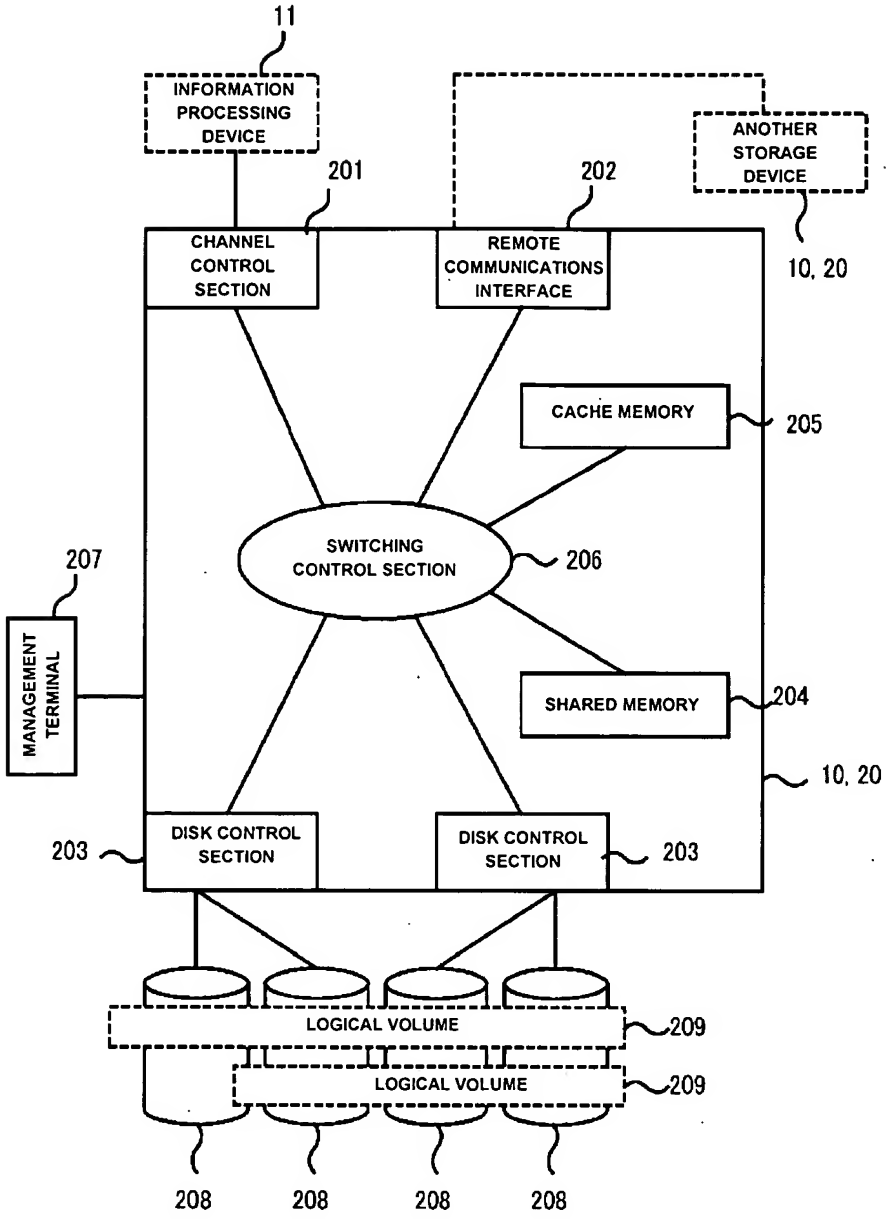

11
INFORMATION PROCESSING DEVICE
ANOTHER STORAGE DEVICE
201
202
CHANNEL CONTROL SECTION
REMOTE COMMUNICATIONS INTERFACE
10, 20
CACHE MEMORY
205
SWITCHING CONTROL SECTION
206
207
MANAGEMENT TERMINAL
SHARED MEMORY
204
10, 20
203
DISK CONTROL SECTION
DISK CONTROL SECTION
203
LOGICAL VOLUME
209
LOGICAL VOLUME
209
208
208
208
208

FIG. 3

LUN	TARGET	MAPPING LUN
0		0
1		1
⋮	⋮	⋮

301

FIG. 4

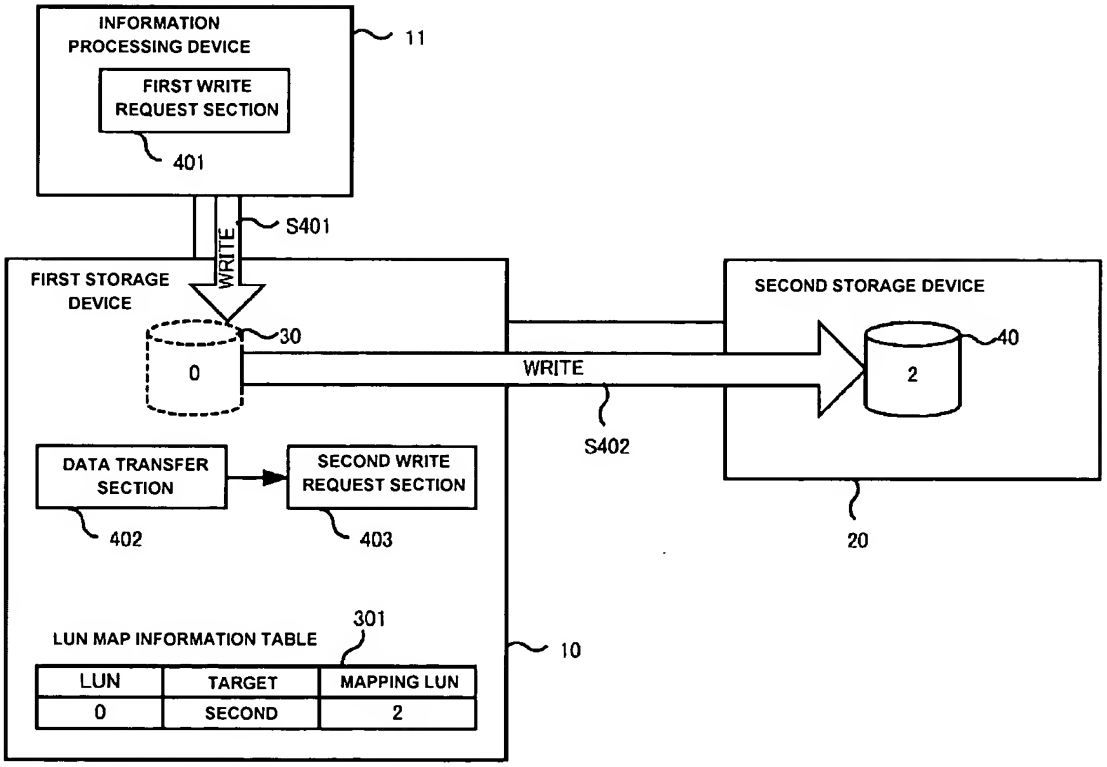


FIG. 5

DEVICE	COMMAND DEVICE LUN
FIRST	0
SECOND	1

501

FIG. 6

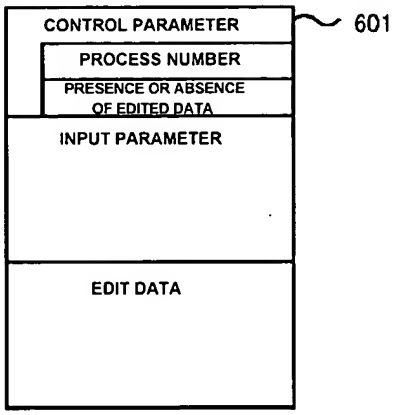


FIG. 7

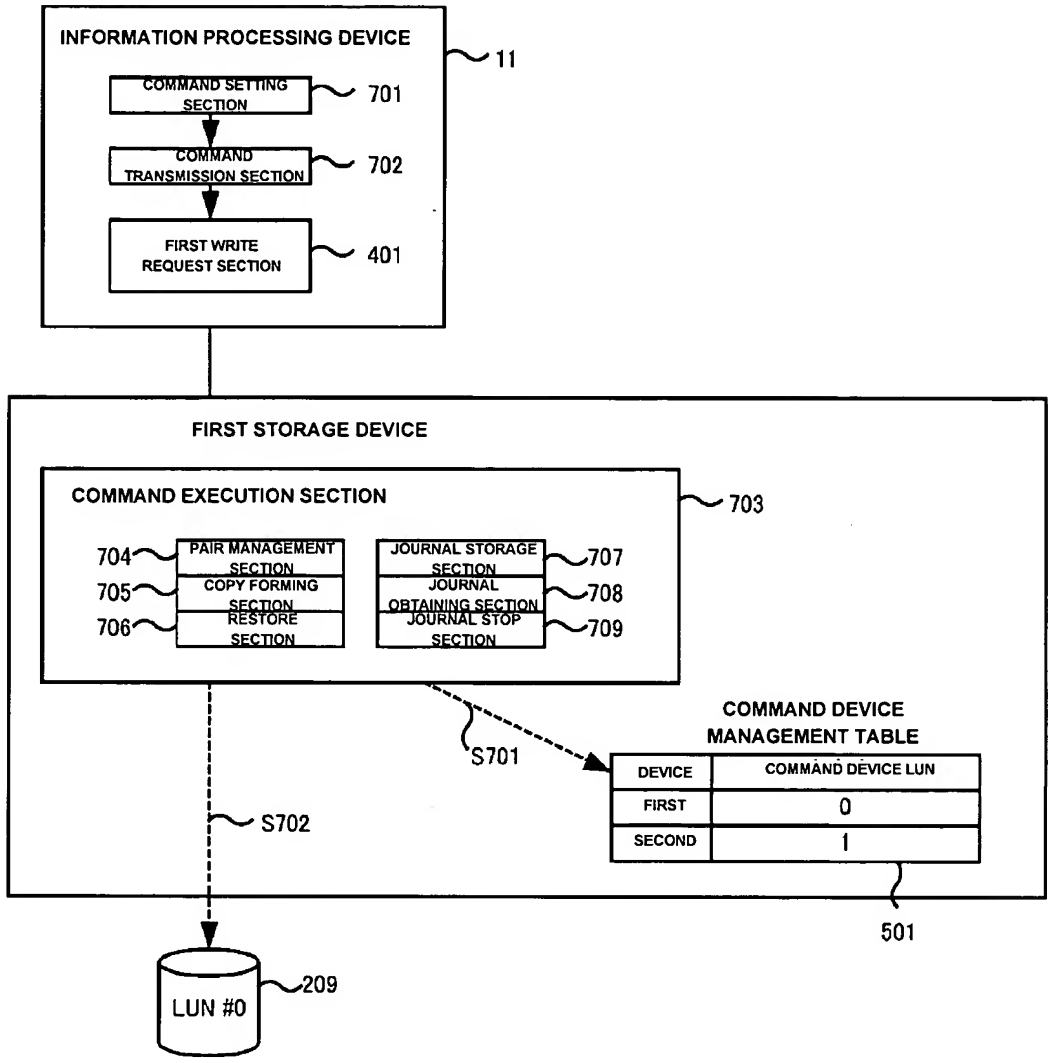

INFORMATION PROCESSING DEVICE
11
COMMAND SETTING SECTION
701
COMMAND TRANSMISSION SECTION
702
FIRST WRITE REQUEST SECTION
401
FIRST STORAGE DEVICE
COMMAND EXECUTION SECTION
703
704
PAIR MANAGEMENT SECTION
705
COPY FORMING SECTION
706
RESTORE SECTION
JOURNAL STORAGE SECTION
707
JOURNAL OBTAINING SECTION
708
JOURNAL STOP SECTION
709
S701
COMMAND DEVICE MANAGEMENT TABLE
DEVICE
COMMAND DEVICE LUN
FIRST
0
SECOND
1
501
S702
LUN #0
209

FIG. 8

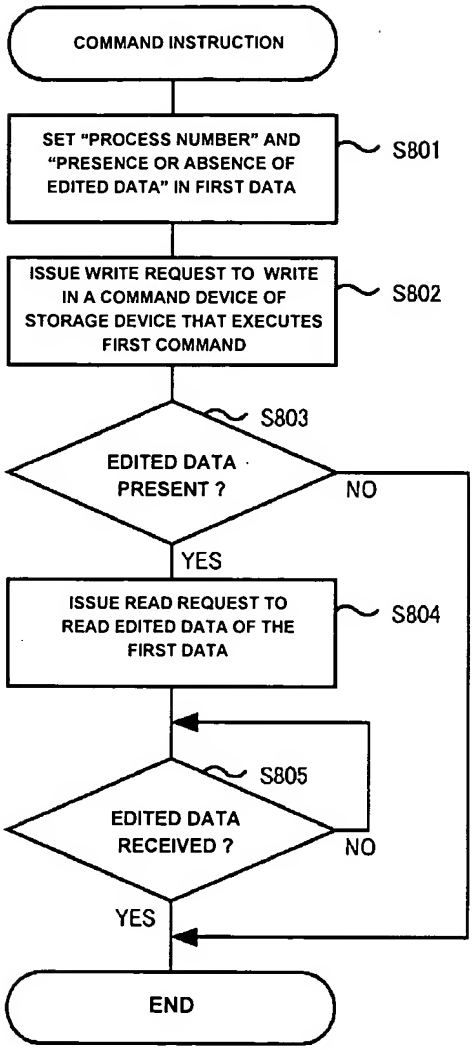

COMMAND INSTRUCTION
SET "PROCESS NUMBER" AND "PRESENCE OR ABSENCE OF EDITED DATA" IN FIRST DATA
S801
ISSUE WRITE REQUEST TO WRITE IN A COMMAND DEVICE OF STORAGE DEVICE THAT EXECUTES FIRST COMMAND
S802
S803
EDITED DATA PRESENT ?
NO
YES
ISSUE READ REQUEST TO READ EDITED DATA OF THE FIRST DATA
S804
S805
EDITED DATA RECEIVED ?
NO
YES
END

FIG. 9

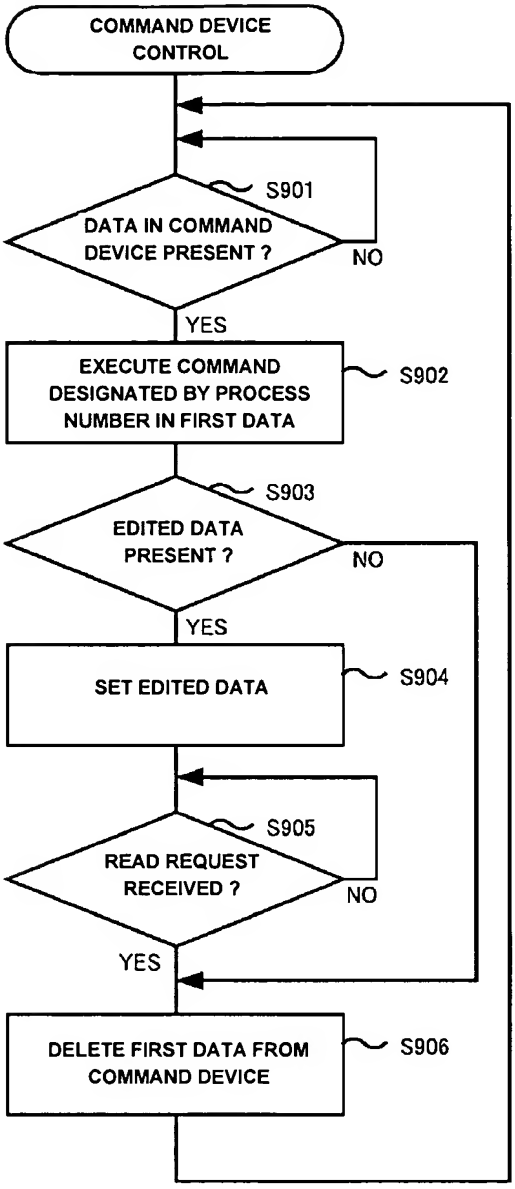

COMMAND DEVICE CONTROL
S901
DATA IN COMMAND DEVICE PRESENT ?
NO
YES
EXECUTE COMMAND DESIGNATED BY PROCESS NUMBER IN FIRST DATA
S902
S903
EDITED DATA PRESENT ?
NO
YES
SET EDITED DATA
S904
S905
READ REQUEST RECEIVED ?
NO
YES
DELETE FIRST DATA FROM COMMAND DEVICE
S906

FIG. 10

COPY SOURCE DEVICE	COPY DESTINATION DEVICE	PRIMARY LUN	PRIMARY JOURNAL	AUXILIARY LUN	AUXILIARY JOURNAL LUN
FIRST	SECOND	0	3	0	3
FIRST	SECOND	1	4	1	4
FIRST	SECOND	2	5	2	5
⋮	⋮	⋮	⋮	⋮	⋮

1001

FIG. 11

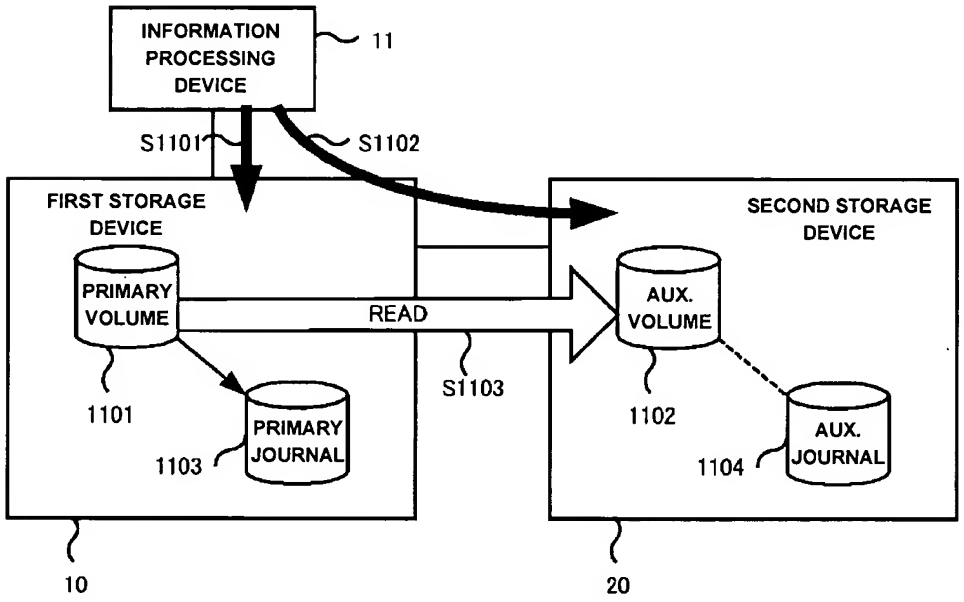


FIG. 12

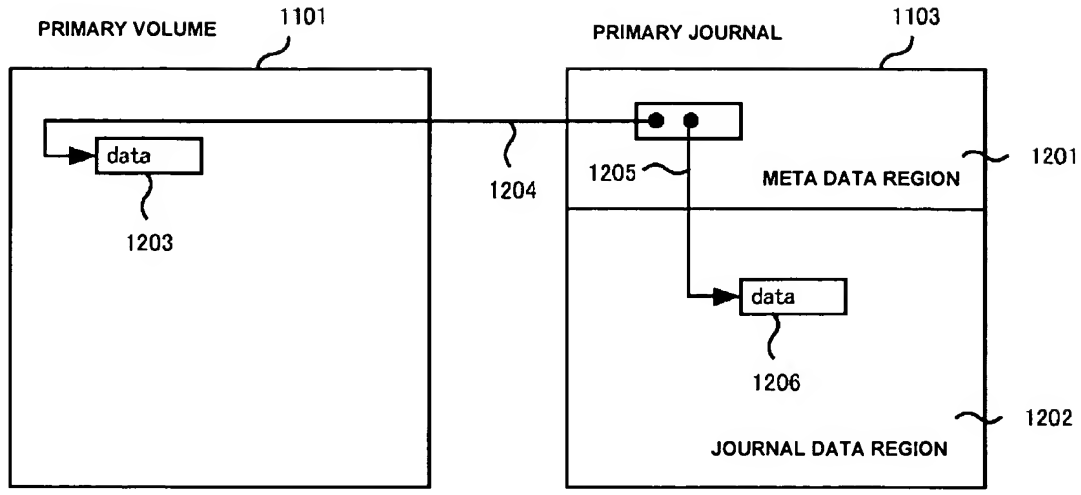

PRIMARY VOLUME
1101
PRIMARY JOURNAL
1103
data
1203
1204
1205
META DATA REGION
1201
data
1206
1202
JOURNAL DATA REGION

FIG. 13

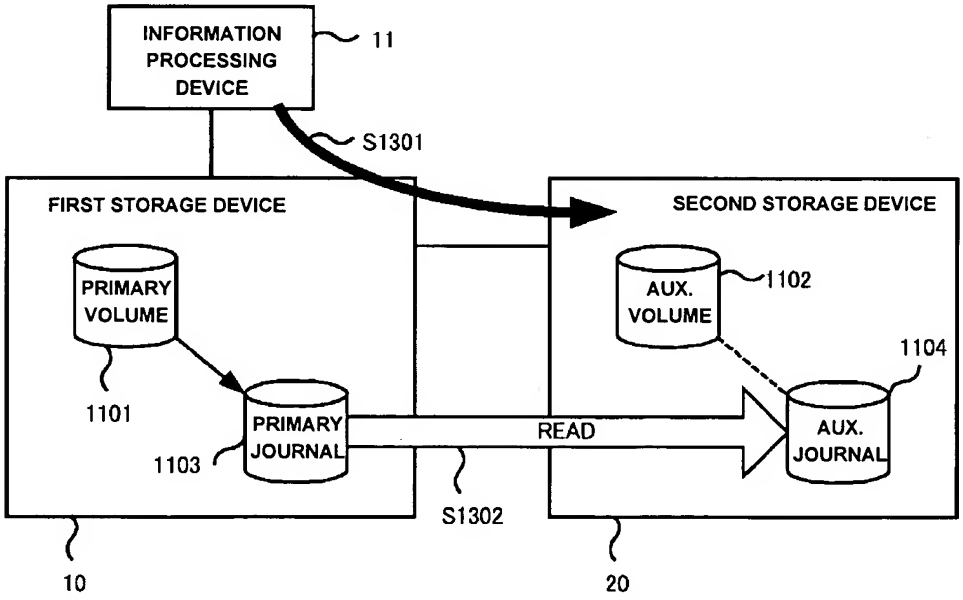

INFORMATION PROCESSING DEVICE
11
S1301
FIRST STORAGE DEVICE
SECOND STORAGE DEVICE
PRIMARY VOLUME
1101
AUX. VOLUME
1102
1104
PRIMARY JOURNAL
1103
READ
AUX. JOURNAL
S1302
10
20

FIG. 14

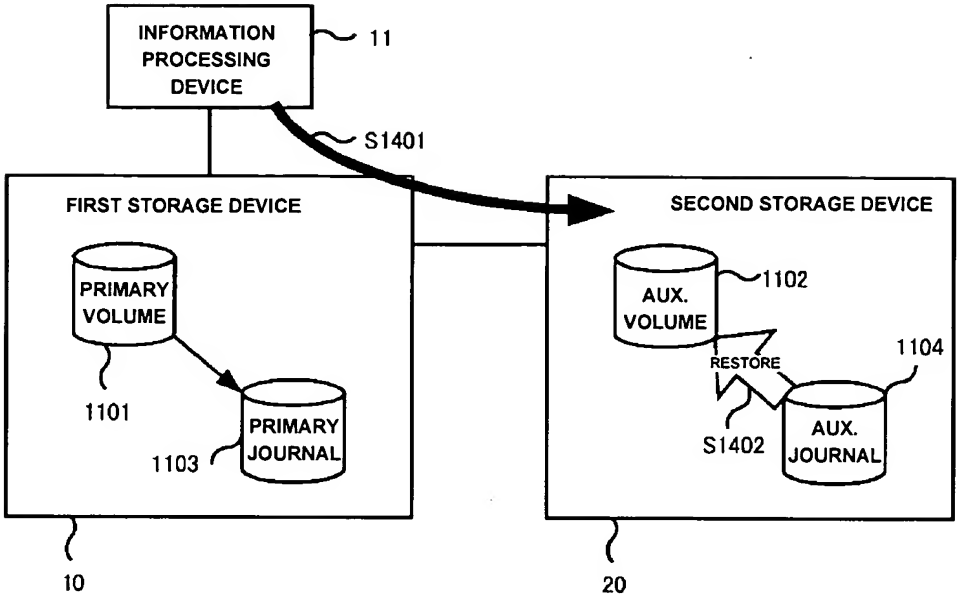

INFORMATION PROCESSING DEVICE
11
S1401
FIRST STORAGE DEVICE
PRIMARY VOLUME
1101
PRIMARY JOURNAL
1103
10
SECOND STORAGE DEVICE
AUX. VOLUME
1102
RESTORE
1104
S1402
AUX. JOURNAL
20

FIG. 15

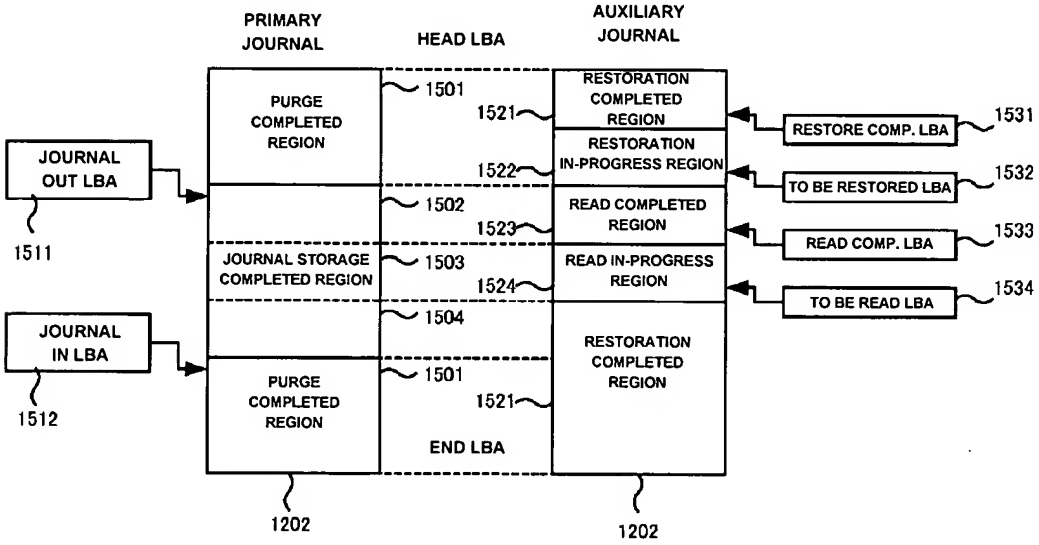

PRIMARY JOURNAL
HEAD LBA
AUXILIARY JOURNAL
PURGE COMPLETED REGION
1501
1521
RESTORATION COMPLETED REGION
RESTORATION IN-PROGRESS REGION
1522
1502
1523
READ COMPLETED REGION
JOURNAL STORAGE COMPLETED REGION
1503
1524
READ IN-PROGRESS REGION
1504
RESTORATION COMPLETED REGION
PURGE COMPLETED REGION
1501
1521
END LBA
JOURNAL OUT LBA
1511
JOURNAL IN LBA
1512
RESTORE COMP. LBA
1531
TO BE RESTORED LBA
1532
READ COMP. LBA
1533
TO BE READ LBA
1534
1202
1202

FIG. 16

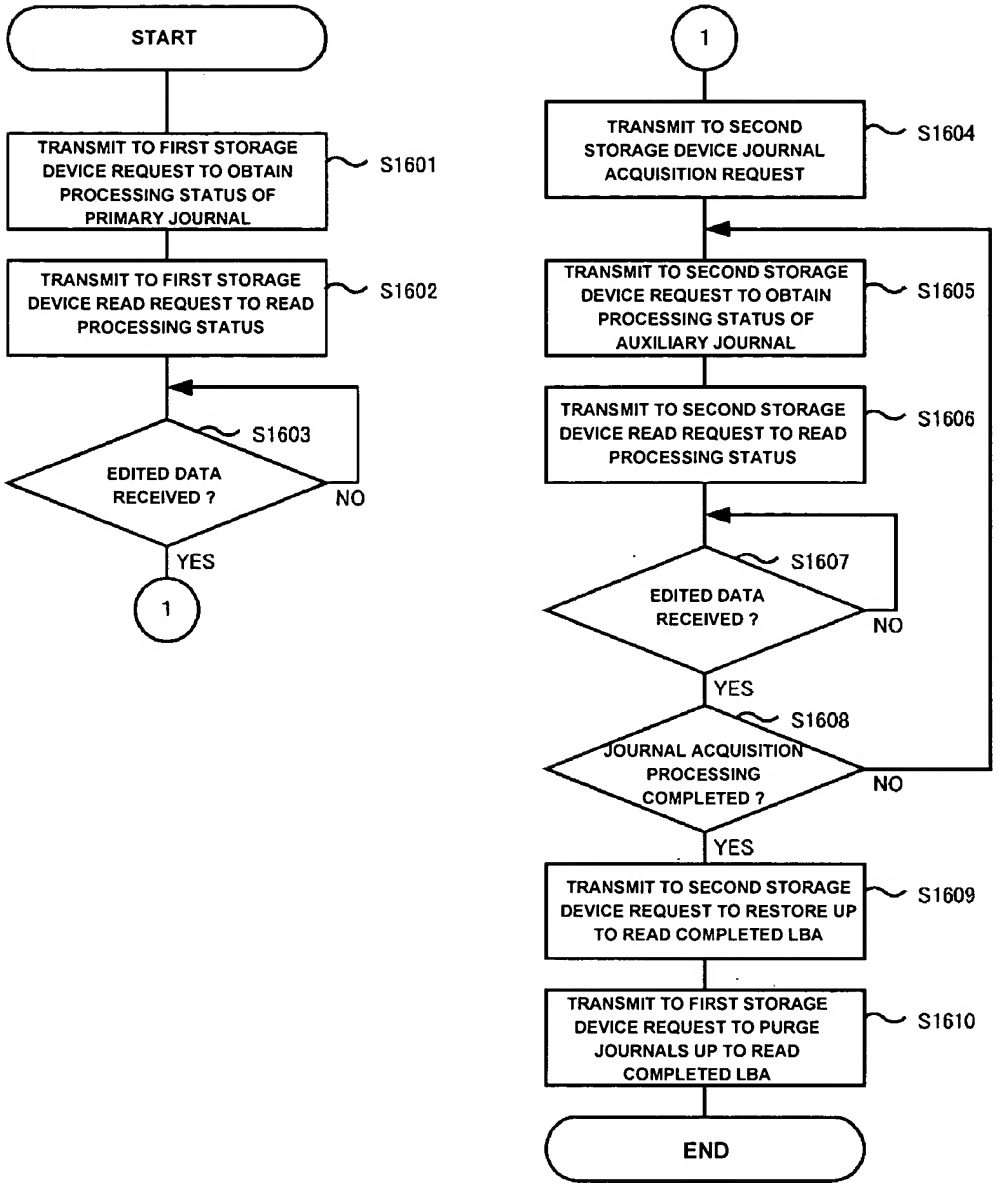

START
TRANSMIT TO FIRST STORAGE DEVICE REQUEST TO OBTAIN PROCESSING STATUS OF PRIMARY JOURNAL
S1601
TRANSMIT TO FIRST STORAGE DEVICE READ REQUEST TO READ PROCESSING STATUS
S1602
S1603
EDITED DATA RECEIVED ?
NO
YES
1
1
TRANSMIT TO SECOND STORAGE DEVICE JOURNAL ACQUISITION REQUEST
S1604
TRANSMIT TO SECOND STORAGE DEVICE REQUEST TO OBTAIN PROCESSING STATUS OF AUXILIARY JOURNAL
S1605
TRANSMIT TO SECOND STORAGE DEVICE READ REQUEST TO READ PROCESSING STATUS
S1606
S1607
EDITED DATA RECEIVED ?
NO
YES
S1608
JOURNAL ACQUISITION PROCESSING COMPLETED ?
NO
YES
TRANSMIT TO SECOND STORAGE DEVICE REQUEST TO RESTORE UP TO READ COMPLETED LBA
S1609
TRANSMIT TO FIRST STORAGE DEVICE REQUEST TO PURGE JOURNALS UP TO READ COMPLETED LBA
S1610
END

FIG. 17

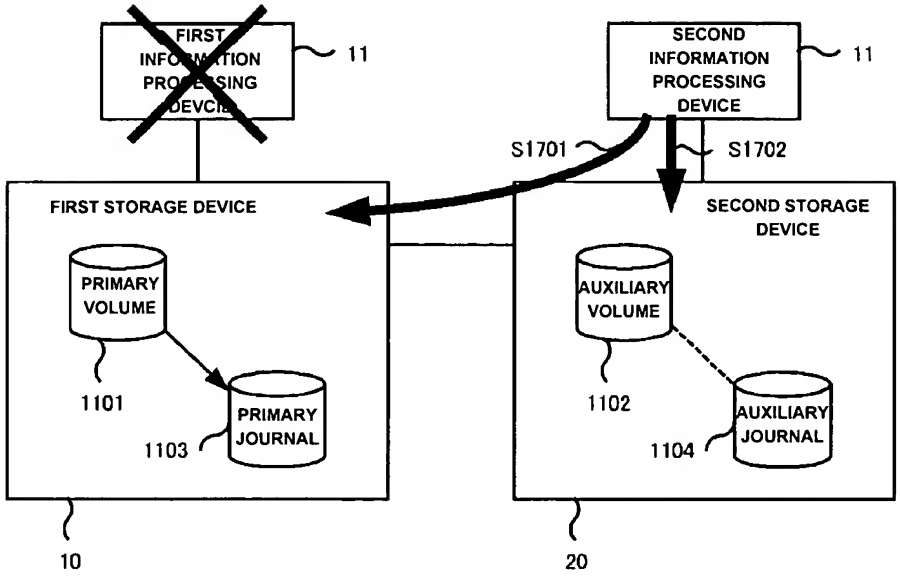

FIRST INFORMATION PROCESSING DEVICE
11
SECOND INFORMATION PROCESSING DEVICE
11
S1701
S1702
FIRST STORAGE DEVICE
SECOND STORAGE DEVICE
PRIMARY VOLUME
1101
PRIMARY JOURNAL
1103
AUXILIARY VOLUME
1102
AUXILIARY JOURNAL
1104
10
20

FIG. 18

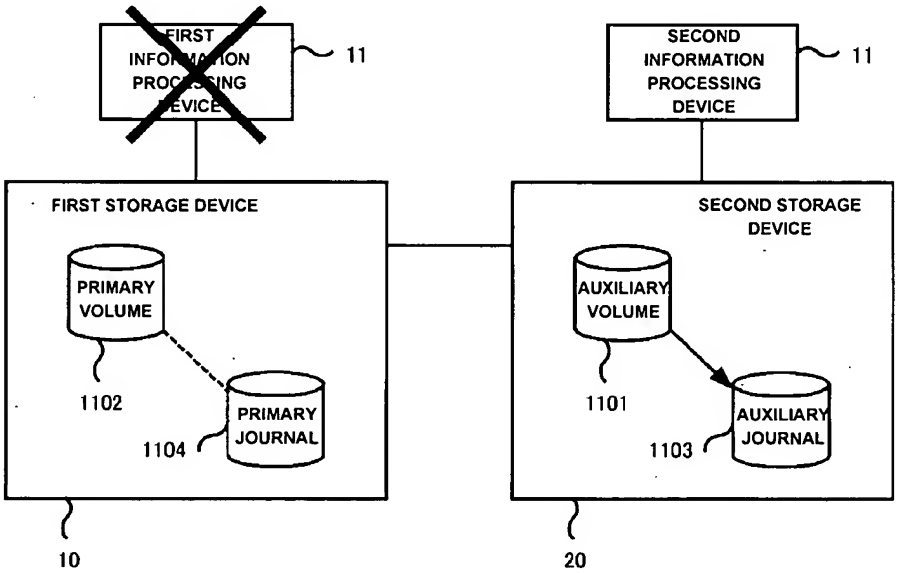

FIRST INFORMATION PROCESSING DEVICE
11
SECOND INFORMATION PROCESSING DEVICE
11
FIRST STORAGE DEVICE
SECOND STORAGE DEVICE
PRIMARY VOLUME
1102
PRIMARY JOURNAL
1104
AUXILIARY VOLUME
1101
AUXILIARY JOURNAL
1103
10
20

FIG. 19

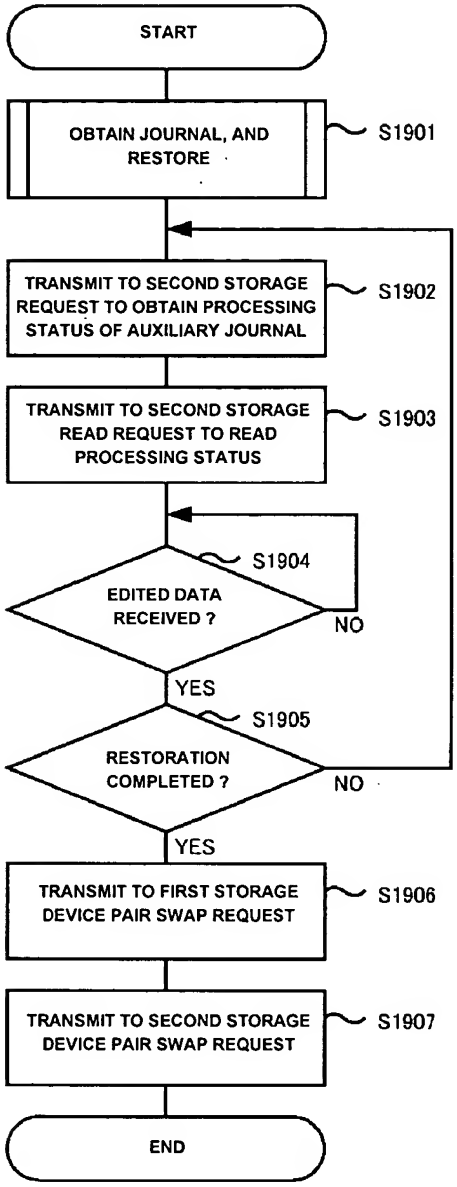

START
OBTAIN JOURNAL, AND RESTORE
S1901
TRANSMIT TO SECOND STORAGE REQUEST TO OBTAIN PROCESSING STATUS OF AUXILIARY JOURNAL
S1902
TRANSMIT TO SECOND STORAGE READ REQUEST TO READ PROCESSING STATUS
S1903
S1904
EDITED DATA RECEIVED ?
NO
YES
S1905
RESTORATION COMPLETED ?
NO
YES
TRANSMIT TO FIRST STORAGE DEVICE PAIR SWAP REQUEST
S1906
TRANSMIT TO SECOND STORAGE DEVICE PAIR SWAP REQUEST
S1907
END

FIG. 20

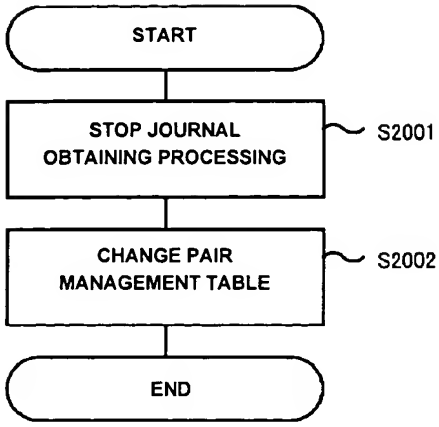
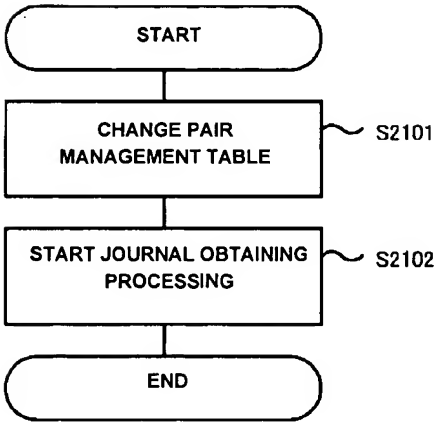

START
STOP JOURNAL OBTAINING PROCESSING
S2001
CHANGE PAIR MANAGEMENT TABLE
S2002
END

FIG. 21


START
CHANGE PAIR MANAGEMENT TABLE
S2101
START JOURNAL OBTAINING PROCESSING
S2102
END